

A Water Review Quarterly

Reclamation

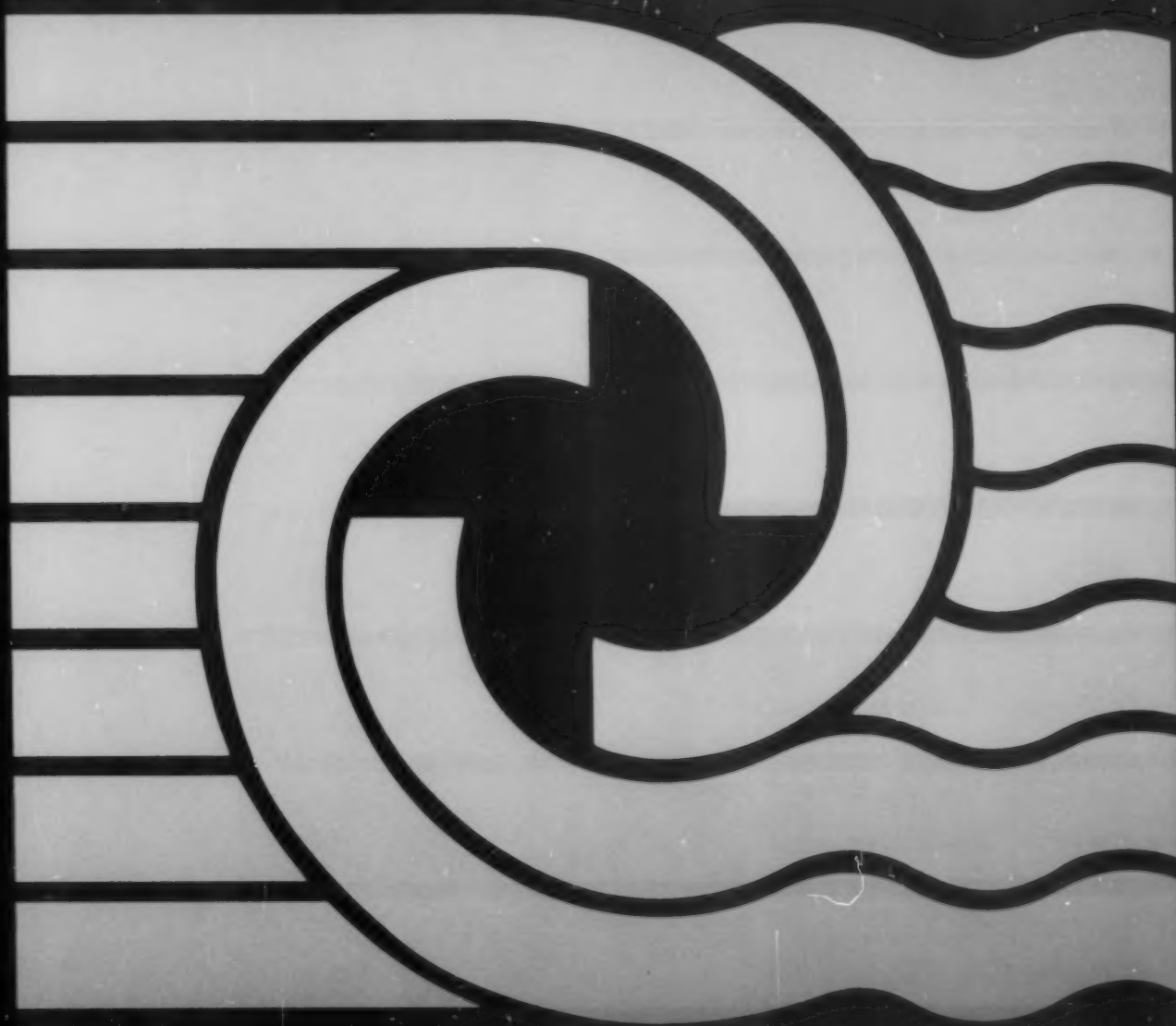
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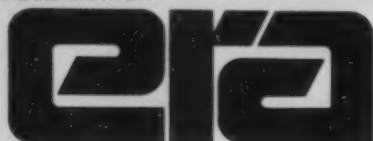
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Wind and Water:
Partners in Power



RECLAMATION



Vol. 64 No. 3

**United States
Department of the Interior**

Cecil D. Andrus, Secretary

Bureau of Reclamation

R. Keith Higginson

Commissioner

Editor

Carol A. White

Letters to the editor should be addressed to: Editor, *Reclamation Era*, Bureau of Reclamation, Code 140, Bldg. 67, P.O. Box 25007, Denver Federal Center, Denver, CO 80225.

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1 Issued quarterly by the Bureau of Reclamation, United States Department of the Interior, Washington, D.C. 20240. Use of funds for printing this publication approved by the Director, Office of Management and Budget, February 3, 1975.

8 As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people.

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16 The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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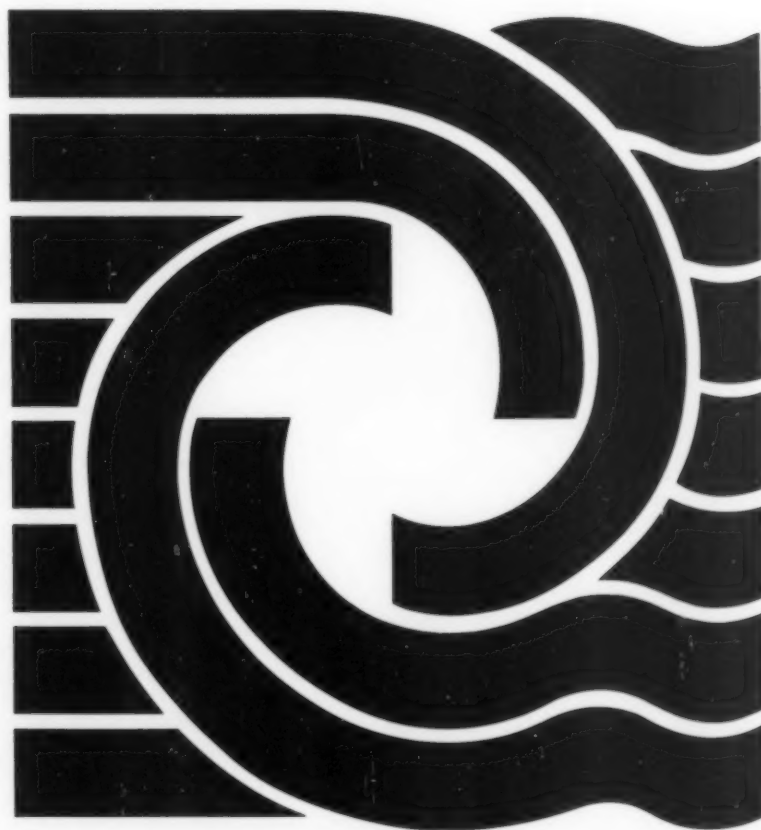
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Wind and Water: Partners in Power

by Lawrence L. Nelson



1

Developing power from the wind is not a new idea. It dates back to 200 B.C. and the early inhabitants of Persia, who used wind power for grinding grain. To catch the wind, the Persian windmill used bundles of reeds tied to the arms instead of cloth. Later, windmills consisting of up to ten wooden booms and rigged with jib sails, were developed. Such primitive types of windmills are still found in use today in many countries around the Mediterranean Sea.

However, one problem has inhibited large scale development of wind power — its erratic and intermittent nature.

In the early days of this country, windmills with an attached storage battery were used to produce electric power. These wind chargers, as they were called, were highly successful on an individual basis. But, when low cost electric power became available in the late 1930's, the wind charger became obsolete.

Lawrence L. Nelson is Reclamation's Project Leader, Division of Planning, Lower Missouri Region, Denver, Colo.

However, with the advent of the Nation's energy crisis, renewed interest developed in the generation of electricity by wind — a renewable resource using modern technology.

One such idea was developed by two Bureau of Reclamation engineers, Stanley J. Hightower and Abner W. Watts.

The Hightower-Watts report, "A Proposed Conceptual Plan for Integration of Wind Turbine Generators with a Hydroelectric System," dated 1977, suggested that a number of wind turbines could be installed in an array at a site near Medicine Bow, Wyo. — one of the windiest areas in the United States. The wind turbine system would be electrically interconnected to the existing Federal power grid through a substation at Medicine Bow. Power output from the wind turbines would thus be integrated with the existing hydroelectric system within the

Colorado River Storage Project (CRSP). The CRSP would serve as an energy and water storage system, and the existing hydrogenerators used to regenerate the capacity and energy in a definite marketing plan.

Energy produced by the wind turbines could be "stored" by reducing electric generation at the hydroplants in an amount equal to the wind turbine generation. Thus, some of the water that would have been used by the hydroplants at the dams would remain in the reservoirs, and would be stored for later use in generating power.

The power marketing plan could provide additional peaking service in July and August, December, January, and February.

Widespread discussion of this concept with industry and Congressional leaders led to the appropriation of funds (Public Law 95-96) by Congress for a 3-year special investigation to determine the economic and technical feasibility of such a concept. The Lower Missouri Regional Office of the Bureau of Reclamation, headquartered in Denver, was named to conduct the investigation.

Bureau of Reclamation Role

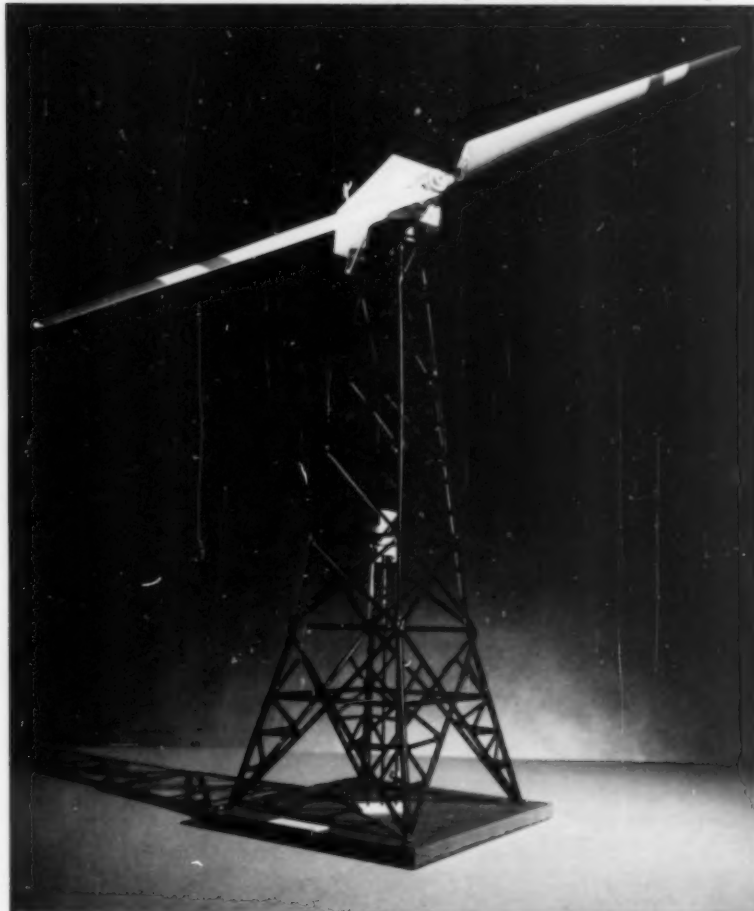
The Bureau of Reclamation's role in this investigation is to analyze the specific site conditions, to prepare an economic analysis and power marketing plan for implementation of these units, and if practicable, to request project authorization from Congress. Reclamation's role in augmenting energy resources from solar sources is a normal extension of its role in water and hydropower resource development.

Early in the investigation it was apparent that project authorization would depend largely upon fully evaluating wind turbine generators at a specific location in the project area.

Installation of a system verification unit will test the integration of wind generation with existing hydroelectric generation. It will also measure any potential environmental impacts as well as foster public support for this unusual project.



Anemometer tower at Medicine Bow, used for testing wind direction and velocity.



Scale model of MOD-2.

First Year Activities - 1978

The first year's activities can be identified in two categories.

The first, the initial efforts of the 3-year study, involved evaluation of wind resources, specific site study, and the analysis of integration of wind energy into the hydro system.

The CRSP would serve as an energy and water storage system.

For this study, the availability of wind energy in an area 5½ miles southwest of Medicine Bow, Wyo., was analysed using wind data collected in the 1930's from a wind tower at the town's airport and five anemometer towers installed in 1977 to gather information about specific site wind data.

The site, an area approximately 20 miles by 40 miles, was divided into five sites, designated A, B, C, D, and E, for testing. Wind direction, velocity, temperature, and atmospheric pressure were measured by the use of graphical recorders.

Wind direction, velocity, temperature, and atmospheric pressure were measured.

These data were reduced to cards and a computer model was developed to simulate the amount of electrical generation that could be produced in this area using design characteristics of both the MOD-1 and MOD-2 wind turbine generators.

After several months of data collection at these five anemometer towers, Site A was selected for installation of a 198-foot meteorological tower to measure the wind characteristics at three levels: 190 feet, 140 feet and 33 feet.

Site selection and clearance with the Federal Aviation Administration was accomplished prior to construction of the tower in late September 1978. The contractor will provide the tower and 2 years of data collection and reduction for the Reclamation investigation.

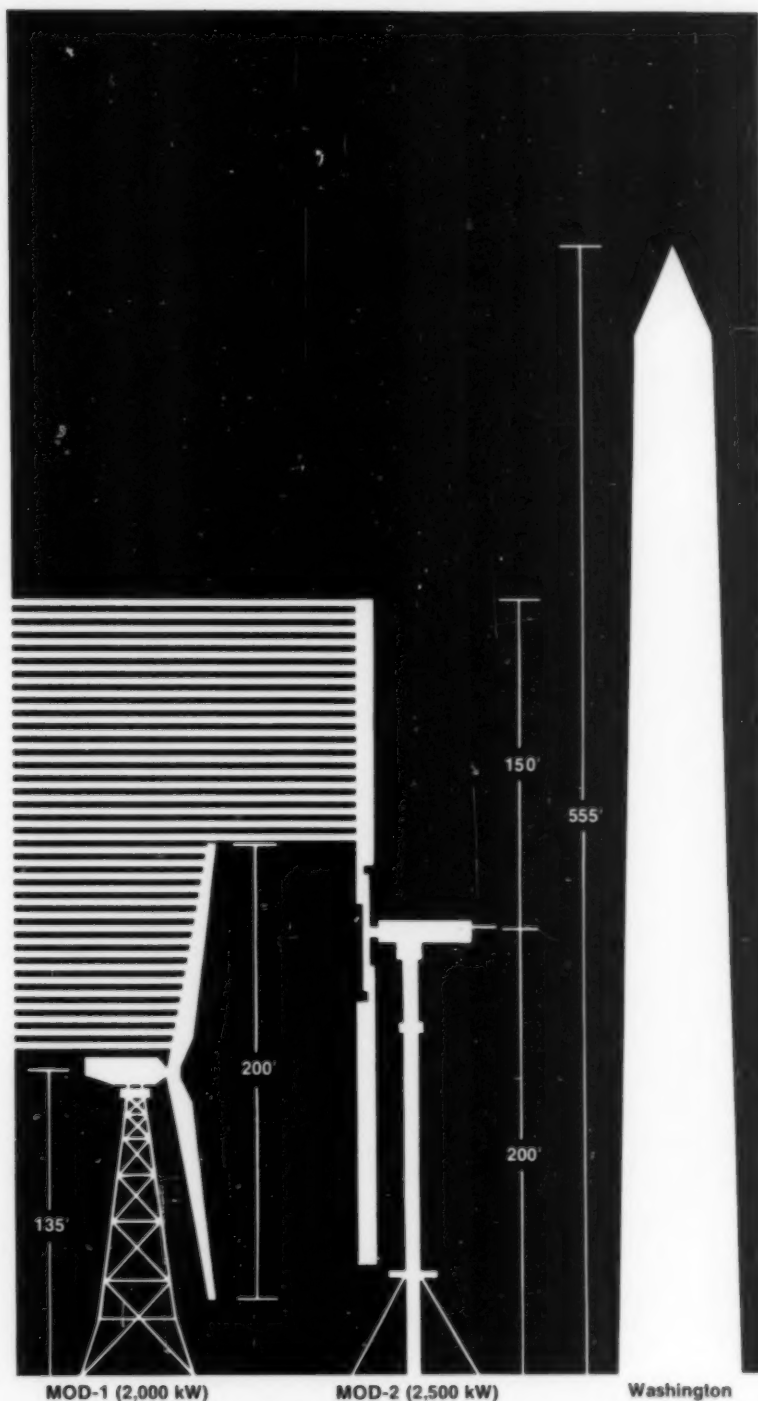
The evaluation of integrating a generating wind system of 100 megawatts into the Colorado River Storage Project is being studied at present. Preliminary analysis reveals no significant changes in the reservoirs' operation will be necessary to accommodate a wind farm of this size.

More detailed analysis and evaluation will be necessary to determine the most economically feasible size for the wind system in terms of integration into a hydro system.

The preparation of a power marketing plan will also entail extensive study. These studies will be done over the next 2 years.

Obviously, the economic studies must await more detailed cost information about potential power benefits. The selection of units for the project will be dependent upon the competitive bidding process after the investigation is complete and Congress authorizes construction.

The second category of first year activities involved the near-term installation of one or more system verification units. Detailed information about Site A was collected. This included a survey of roads, transmission lines, and special environmental studies.



The site has the many advantages of being close to the town of Medicine Bow and a railroad switchyard, which will provide a supply route to the site. It also is close to a Federal substation, providing convenient access to a 115-kV powerline which ultimately ties into the Colorado River Storage Project power system. U.S. Highway 30 passing through Medicine Bow will allow the public adequate access to visit the wind turbine facility.

For the purposes of the study, the Bureau of Reclamation used the MOD-2 turbine characteristics.

The Bureau of Reclamation has maintained close contact with the Wyoming Game and Fish Department, the U.S. Fish and Wildlife Service, and the Department of Energy throughout the planning process. Representatives from these agencies joined Reclamation field teams to survey the proposed sites.

The Wyoming Game and Fish Department and the U.S. Fish and Wildlife Service were involved in the initial scoping efforts when it was decided which environmental issues merited intensive study.

The Wyoming Game and Fish Department expressed concern about four areas of impact related to the project: possible black-footed ferret and raptor populations, waterfowl, and antelope wintering habitat. The Game and Fish Department has also indicated it prefers construction on Site A rather than on an alternate location.

Although the results of the raptor study have not been received, preliminary conclusions submitted by the contractor show that none of the proposed verification unit locations fall within highly sensitive areas as determined by aerial and ground surveys.

The black-footed ferret study contracted to Dr. Timothy Clark of Western Environmental Research Associates of Jackson, Wyo., has been completed.

Although no ferrets were observed at any of the sites, Dr. Clark recommended that units be located at least one-half mile from certain areas of high concentrations of prairie dogs. The proposed layout of units at Site A has complied with this recommendation.

Possible impacts on cultural and scientific resources were studied under two additional contracts. The first was executed by the Office of the Wyoming State Archeologist and consisted of a survey of a 50-acre tract at each site. Its report granted historical and archeological clearance for the construction of the meteorological tower at any of the five sites.

Reclamation has maintained close contact with other agencies.

The second contract was executed by Dr. Paul McGrew, a consulting paleontologist from Laramie, Wyo. His report stated

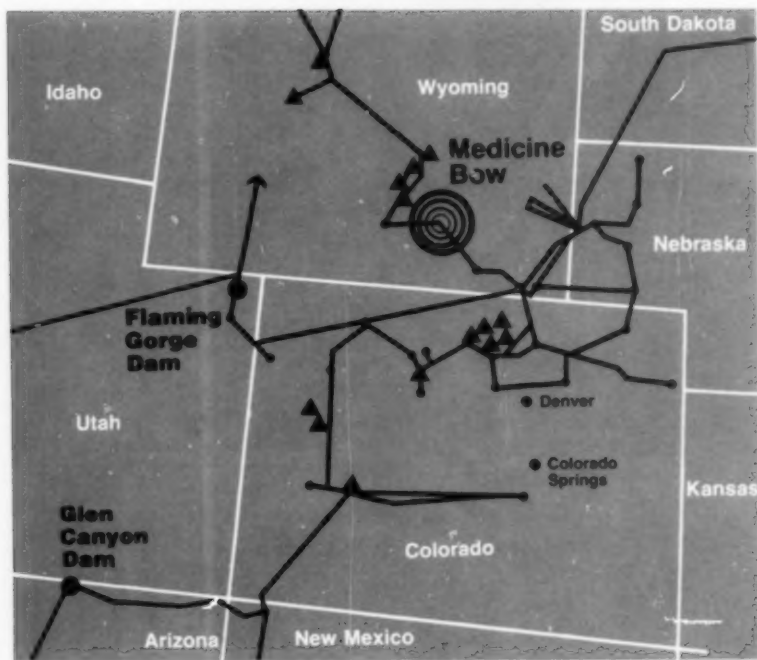
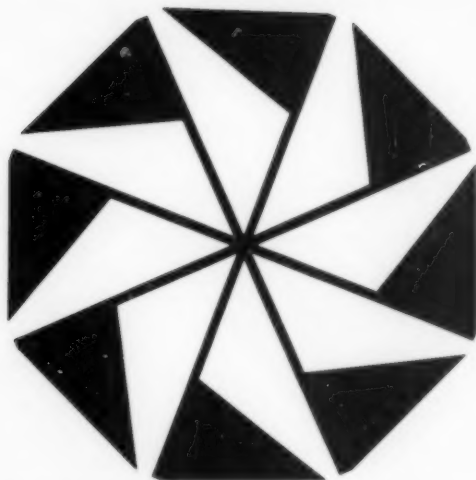
that there were no known significant paleontological resources at any of the five sites.

In addition, Reclamation environmental specialists have evaluated the present status and possible impacts of the proposed construction on other wildlife and vegetation, as well as the potential effect on the aesthetic quality and socioeconomic character of the area.

As a result of extensive site evaluation, Site A was selected as the best site for a system verification unit or units. An environmental assessment report is being prepared for review.

Investigation Schedule

Appropriations for fiscal year 1979 include funds to continue in the two categories previously discussed. The 3-year special study will continue to collect more specific data about the project area. The Bureau of Reclamation will formulate a project plan using the latest economic costs and benefits, develop a marketing plan, and prepare a report and environmental documents for Congressional action.



Legend

- Powerline —
- Powerplant ▲

The fiscal year 1979 budget also includes \$2½ million for a system verification unit to be built by the Bureau of Reclamation. It may also be possible to participate with the Department of Energy for the installation of four other units in the project area. The Bureau of Reclamation site selection process and environmental assessment report will be adequate for installation of one unit or multiple units.

Industry representatives have also expressed their interest in developing a wind turbine generator capability, and would like to begin production as soon as possible if large orders would be received.

The Bureau of Reclamation is very optimistic that the 3-year study will result in a project plan which Congress could authorize and fund in the mid-1980's. At this time, it is not possible to quantify the project size, but the Bureau is confident that at least 100 megawatts will be economically feasible, and perhaps as much as 500 megawatts.



The Vanished Anasazi

by Dr. Ward Weakley

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Who were the Anasazi? Why did Anasazi select the Dolores River Valley as a place to live? How did they live, and why did they abandon their homes after 1,000 years habitation?

Answers to these and many more questions are being laboriously sought by a group of archeologists working for the University of Colorado, under the direction of Dr. David A. Breternitz. Dr. Breternitz and his colleagues from a number of universities and private organizations started their research in June 1978 under a \$450,000 contract with the Bureau of Reclamation. This study is being conducted under Reclamation's Dolores Project Cultural Resources Mitigation Program. When fully funded and completed, the Dolores Project Cultural Resources Mitigation

Dr. Ward Weakley, Chief Archeologist for the Bureau of Reclamation, Engineering and Research Center, Denver, Colo.

Photography by: Vern Jetley, Regional Photographer, Upper Colorado Region, stationed in Montrose, Colo.

Program will be one of the largest such archeological digs ever undertaken in the United States.

One of the largest such archeological digs ever undertaken in the United States.

The dig is located near the McPhee Dam and Reservoir site in the southwestern corner of Colorado, about 15 miles northeast of the town of Cortez. A total of 600 potential sites within the dig area have been identified for possible research.

Anasazi is the Navajo word for Ancient Ones. They were also known as the Basket Makers. Their culture developed and flourished in the area where boundaries of Arizona, New Mexico, Colorado, and Utah meet, known today as the Four Corners area.

The origin of the Anasazi is unknown. What is known is, when the Anasazi first settled in the Four Corners area, they were already accomplished basket weavers and were supple-

menting their food supply by cultivating maize and pumpkins. They lived in caves and in shelters constructed of poles and adobe.

The Dolores River dig is a multi-occupational site, meaning it has been used several different times. The first extensive human use and occupation of the Dolores River Valley occurred approximately 1,500 to 2,000 years ago. The people who lived their lives in this area were successful for the next 1,000 years and then seemingly abandoned it.

There may well have been earlier residents of the valley and hints of such have been indicated in the archeological record. Studies to locate and identify earlier materials, as well as more recent occupational remains such as those left by the precursors of the present-day Ute Indians and the historic intrusion of the present Euro-American inhabitants of the Dolores Valley, are part of the mitigation program. But, the primary focus is on the Anasazi who inhabited and farmed the Dolores River Valley.



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YCC/YACC teens excavate a kiva, a round Indian dwelling usually made of stone or wood with a thatched roof.



Careful notes are made as digging progresses.



Excavation goes on at cave dwelling site.



Overview of one site in dig area.

Anasazi . . . Navajo word for Ancient Ones . . . also known as Basket Makers.

The questions being asked by the archeologists can be summarized generally as follows:

- When did the Anasazi arrive in the area and why?
- How did they use the resources available to them?
- How and why did they change their organization and use of the area through time?
- What were the environmental conditions in the area when the Anasazi were present, and how did these conditions affect them?
- What were the relationships of the people in the valley with other surrounding groups?

- What were the trade systems in which the people participated?

- What did they trade?
- What were the beliefs the people held and what ceremonies and rituals did they practice?


- Why did the Anasazi abandon the area after so long a period of successful occupation?

These questions are exciting and the answers will ultimately help to fill in the picture of a way of life that is gone. The story may also reveal clues that will help present-day use of the area be successful where the earlier inhabitants failed in the sense that they abandoned the valley.

All available technology and talent are being utilized in this research study. Equipment ranges from standard shovels, trowels, and paint brushes, to sophisticated computers and up-to-date laboratory supplies and instruments. The talent includes archeologists, anthropologists, botanists, graduate students, and Youth Conservation Corps teenagers. When completed there will be the usual technical reports, photo-

The first extensive human use . . . occurred approxi- mately 1,500 to 2,000 years ago.

graphs, and specimens — as well as general summaries, films, and an interpretive center for the general public.

As a result it is anticipated that for the first time many of the questions being asked will be answered, plus a large body of information will be available for on-going studies long after this particular research study is completed. Research on this archeological site will continue through much of the project construction, so final results are several years away. 

Water Conservation is?

by Guy Martin



I'm very pleased to be here today to share with you some Administration perspectives on President Carter's recently announced Water Resources Policy.

As many of you know, this is the first comprehensive water policy specifically adopted by a President of the United States in decades. Water policy has been the subject of virtually continuous study over the past decades, and a number of major reports and recommendations have been produced, but no President has taken action to formally adopt a policy as his own. President Carter has openly and firmly set the standard he will use to guide

Guy Martin, the Department of the Interior's Assistant Secretary for Land and Water Resources, presented these remarks during a panel discussion, at the 1978 National Water Resources Association convention, in San Antonio, Tex.

First comprehensive water policy specifically adopted by a President of the United States in decades.

Federal activities in water policy and to work with the many state, local, and private entities which manage our precious water resources.

Some have perceived the President's policy as a threat, or a call to arms, but I would specifically suggest to you that, rather than a threat, it represents one of the most unique and beneficial opportunities that the entire water resources community has had for taking progressive steps in water management in many years. The personal priority which is given to this issue by the President, and the continuing care which he intends to give, represent unprecedented commitments on the part of a national administration, and create an extremely favorable environ-

ment for progressive change in water resource planning, management, and development.

Today's meeting represents a special opportunity for me as compared to other appearances I've made following the announcement of the President's policy. Rather than being asked to give a general report on the overall policy and its implementation, for which I will be carrying out the Secretary of the Interior's lead responsibility, I have been asked to focus on one major theme of the policy. That is water conservation, and with only one initial diversion, I do want to focus on that important theme.

The need to make a side comment was raised by several of the statements made yesterday by former Governor Connally in his speech to this meeting. If, as I understand it, this group applauded a statement by Governor Connally that it would be terribly wrong for this Nation to now pursue a no-growth objective through its water policy, then I would join in that applause. But, if, as I further understand it, Governor Connally stated that it is a "no-

growth" motive which characterizes this President's approach to water resource policy, then the Governor badly misinterpreted or misrepresented both the facts and the President's intent regarding water resource policy. What is astonishing about such a statement is that it almost totally misconstrues both the factual record and the basic approach that President Carter has taken since the initiation of his Administration.

Water policy and the important issues of water resource planning, management, and development have occupied this President's attention and interest to an extent which is virtually unprecedented. For some, the original "hit list" was an infamous act; but for many others it was the strongest possible signal from the President that he was undertaking a new and serious effort to subject water development to higher and more modern standards. The actual impact of the hit list was substantially less than many have portrayed in subsequent reports. It resulted in a final challenge to only nine projects out of well over 200 initially studied. Right after the water project review, the President followed up with the initiation of a comprehensive review of Federal water policy designed to broaden the base of consideration given to water resource problems.



The new starts in President Carter's FY 79 budget were the first proposed in four years.

On more specific issues, the common theme of this Administration has been to make a concerted and open effort to resolve problems rather than ignore them where they related to water resource development. The problems which affect or threaten Auburn Dam, the Westlands Water District, or the Garrison Diversion Unit cannot be shoved under the rug; they must be openly dealt with along with constructive options for their resolution.

This is exactly what the President and Secretary of the Interior have done in their actions on these projects. The new starts in President Carter's FY '79 budget were the first proposed in four years, and with the exception of one year, were the most proposed by any President in over a decade.

This was a conscious effort to demonstrate a willingness to move forward with water development, and it was a demonstration that good and well-justified projects will receive strong support from this Administration. Although it was unfortunately necessary for the President to utilize his veto power to defend his decisions, his victory on the veto override did not result in a vindictive or negative attitude on the part of the Administration. Rather, it was the Administration who stood on the doorstep of Congress virtually the next day with a constructive compromise. It is clear to me that this atmosphere of compromise will lead to a new and progressive public works appropriation for the coming year.

There is nothing in this record to suggest that the water resources policy of this Administration is predicated on a no-growth motive. To the contrary, the President has put water issues at the top of his agenda and prepared policies to continue a progressive and constructive water resource program at the Federal level. He has done so openly with an invitation to all to participate and affect the formation of that policy. The President and the Secretary of the Interior do not intend and do not desire anything less than a sound program and a fine working relationship with the water resources community. Attempts to create a polarized situation are not in our plans; we believe to do so is a disservice to the Administration and the long-term goals of those who care most about water resources.

Water conservation is but a part of any complex solution to serious water resource problems.

Since the President's Water Policy Message, with its central theme of conservation, was announced by the President, I have rarely met a person who has spoken out against the concept of water conservation.

On the other hand, I have met many people who are deeply concerned that the President mentioned it so prominently in his policy. A great deal of the concern probably comes from the nature of public policy itself, particularly Presidential policy. It consists of broad statements of direction and intent, and of commitment on behalf of the Chief Executive of our Nation. The result is that every person and interest group assumes their own specifics regarding the policy, usually in terms of the worst case as applied to themselves.

To allay such fears and bring some perspective to the Presidential intent with regard to his policy and the specific element of water conservation, let me suggest some additional details. In many respects, the Presidential intent with regard to water conservation in this policy is not substantially different from that suggested by the President on energy conservation. That is, conservation is a resource management technique which has always been present and has always been discussed and to some extent always been practiced, but *never* with the emphasis or priority it deserves.

Even though water conservation has been practiced over the years, the strongest emphasis has generally been on the supply side of the equation. What the President is proposing is to elevate consideration of conservation to a substantially greater prominence in water resource decisions and to look at efficiency in water use and reduction in demand as principal water management goals.

Some believe the most important thing is the specific definition of water conservation. H. L. Mencken once said that "even the most complex problems have solutions which are simple, straight-forward, and *wrong*." In some respects, I think the fear exists that the President considers water conservation as the sort of simple solution that Mr. Mencken suggests. This is not the case. I believe the President realizes that water conservation is but a part of any complex solution to serious water resource problems. It is a substantially higher priority for water conservation that the President wishes to sponsor.

High priority for water conservation.

Commissioner of Reclamation Higginson said this morning, for instance, that he believed that the water conservation component of the President's policy created a new obligation on the part of the Bureau of Reclamation to more systematically and fully evaluate the role (either as a component or alternative) that water conservation could and should play as a water resource project is evaluated, planned, and moved forward.

While I believe the approach the President takes and the practical application that the Commissioner suggests have been, to some extent, present in water resource practice over this and past decades, the President's policy recognizes some new and growing realities.

In the first place, there is a growing competition for water. This competition is manifested in many sectors but most clearly in the competition between agricultural users and energy and municipal and industrial users. Water saved in one vector will permit use in another.

14 Second, there is the growing reality of economics. The costs of large projects is increasing and this fact will mean that it will become more difficult to gain political support for funding water resource development projects, and place greater emphasis on less costly alternatives. One of the best is conservation.

There is a growing competition for water . . . a growing shortage of sites.

A final reality which I would mention today, but by no means the end of the list, would be the fact that there is a growing shortage of sites which are available for major water resource development. When I speak of a shortage, I do not speak of a physical shortage of sites, although that too is of substantial concern. Rather, there is a shortage of sites which in physical and political terms are acceptable. This too, will create substantial pressure to broaden the consideration of alternatives which recognize this problem.

Former Governor John Connally said it yesterday when he indicated in the strongest of terms that there is "a limited amount of water available to man." I agree, but I do suggest that our response must be substantially broader and less polarizing than the one he suggested to this group.

In a recent issue of *National Water Life*, the publication of this organization, I read with interest an article on the water policy by a man I have come to greatly admire during the formulation of the President's water policy. I speak of Governor Scott Matheson of Utah. In his article he suggested the following definition of water conservation: "The wise and efficient use of the resource." I find little to differ with that general definition of water conservation, although the President's objectives in his policy were substantially more focused.

There are, of course, major questions which remain open. First, does the policy intend to treat both supply and demand considerations seriously? The answer is yes. The very first sentence of the section of the President's water policy message which dealt with conservation said, and I quote the President: "Managing our vital water resources depends on a balance of supply, demand, and wise use." Continuing, the President said: "Using water more efficiently is often cheaper and less damaging to the environment than developing additional supplies. While increases in supply will still be necessary, these reforms place emphasis on water conservation and make clear that this is now a national priority."

By this distinction, the President created a true national policy focus on water conservation which seeks efficiency of use and reduction of demand, and at the same time places such actions in a substantially more important place in the overall water resources process.

Strong Federal water supply programs will continue under a policy of strong support, as indicated by this year's new starts and the final public works appropriations. But the President seeks to establish a greater role for use efficiency and demand reduction in the overall process, and it is these elements which best characterize his approach to conservation.

Virtually since the time the policy was articulated, work on clarifying and implementing the President's intentions on water conservation has been going forward, and I expect it will continue with your help.

Closely related is the issue of sensitivity to regional or local conservation needs and practices.

Closely related is the issue of sensitivity to regional or local conservation needs and practices. The question is whether or not the President recognizes regional or local differences, and contemplates a water conservation policy which is sensitive to these differences. The answer is yes, and I would cite for your reference the \$25 million technical assistance program in conservation that the President included in his water policy. This specific element in the policy is a conscious attempt to provide States with funds to enable them to devise conservation strategies and policies which are most suitable to their own regions.

There are still many specifics to be resolved about the conservation elements of the policy beyond the basic intent of the President, includ-

Task forces are at work.


ing the way in which his specific objectives are used in the planning system. This is what the implementation effort is all about. Several task groups are specifically devoted to issues of conservation, and your participation is earnestly solicited.

The most important thing I can suggest to you today is not my own interpretation of the policy but rather the way in which you can influence the policy implementation yourself. Although the President has clearly articulated his intent and the emphasis he wishes to create, there is much implementation detail to be developed. To accomplish this, some half dozen separate task forces are at work on various elements of conservation — the cornerstone of the President's policy. One task force is led by the Department of Housing and Urban Development (regarding Federal housing programs), still another is led by the General Services Administration (regarding the Federal Government's use of water), another by EPA (regarding Federal loan programs), and still another by the Department of the Interior (regarding water pricing as it affects conservation). Finally, there is a task force headed by the Department of the Interior and chaired by Gary Cobb, Director, Office of Water Research and Technology. It is looking beyond the specifics of the above programs, to all Federal programs in which water conservation might be encouraged, and to prepare for us, and the public, some future objectives for carrying out the emphasis on water conservation the President has set out.

My office has been assigned the lead responsibility for coordinating and overseeing this policy, and I believe I can be of assistance in getting you in touch with the task forces which are responsible for each of these tasks. This is an open process and one to which we invite your fullest participation.

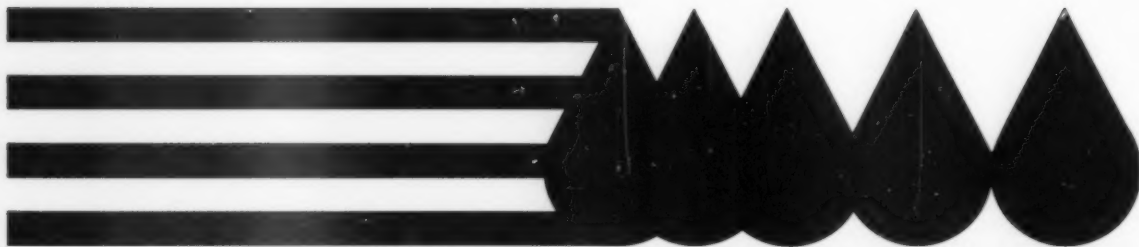
My office has been assigned the lead responsibility for coordinating and overseeing this policy.

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Many of the people who are working diligently on implementation of the President's water policy are with you in this conference, and I urge you to talk not only with me, but the other people here. I look forward to the comments of my colleagues on this panel and to a full discussion of the President's new and progressive water policy. 

Let's Talk About Subsidies

by R. Keith Higginson



16

It's good to be with you today here in San Antonio.

We meet at a time of changing and often conflicting public needs and interests. Urbanization continues . . . living standards climb . . . the need to develop and conserve energy on a massive scale increases . . . and Americans are becoming much more aware that we must limit adverse environmental impacts on our land and water, as well as other natural resources.

This is the atmosphere in which we live and work today. We see society in a tug-of-war . . . pulling in different directions . . . with diverse interests and competing aims. Never has this competition been so open

R. Keith Higginson, Commissioner of Reclamation, presented these remarks at the 1978 National Water Resources Association convention in San Antonio, Tex.

— with increasing recourse to the courts, more lobbying at the state and national levels, and well organized campaigns for public support.

Some may take refuge in the old cliché: 'Twas ever thus!

Or in modern parlance: So what's new!

I am here today to say: it was not ever thus . . . and there's a lot new on the American Scene in recent years.

One new item is the public's concern for our local, state, and national budgets — and how the dollar will be spent.

Public's concern for local, state, and national budgets.

California's Proposition 13 wasn't just an unlucky number. The American people have consistently been defeating public bond issues and similar proposals for the past several years. If the '60s was the decade of social accountability, the '70s may be the decade of financial accountability.

Out of this public debate — and public battle over local, state, and Federal budgets — has emerged a major public issue concerning the program of the Bureau of Reclamation. In a single word, that issue is *subsidization*.

In various news articles, speeches, and other public statements, the Bureau — and thereby the Federal Government — is criticized for subsidizing the agricultural water users and other water projects beneficiaries in the West.

This is not a new concern, as all of us know. And it's not surprising since the *repayment* by the beneficiaries of the costs of constructing western water projects has not been prominently publicized.

It appears essential today to set the record straight . . . to state what the repayment policies are . . . to relate the Reclamation program to the entire spectrum of Federal subsidization . . . to set out agricultural irrigation's role in Reclamation as a whole . . . and to sum up the benefits to the country, as well as the 17 Western States, from Reclamation programs.



But first, it seems clear we should look at the mood of the country. Because that's the impetus for much of the national debate about the Federal budget . . . taxes . . . and, in our case, the Reclamation subsidy.

Rarely if ever have we witnessed greater public contention about tax dollars . . . yet . . . the Nation is spending more Federal tax dollars than ever before. The projected Fiscal Year 1979 budget is more than \$568 billion. This compares to a budget of only \$184.5 billion just 10 years ago in Fiscal Year 1969. The Reclamation budget that year was \$277 million compared to the President's recommended budget of \$618 million for FY 1979. The public is also demanding greater financial accountability in expenditure of these tax dollars.

And finally: the Nation is involved in a major battle against inflation.

These three considerations — and others — have created a new public mood in the country. Simply put, more Americans want a closer reckoning of our Nation's accounts. And this mood has produced a good

many challenges on how the country spends its money. One challenge covers the general area of subsidization.

The definition of "subsidy" — like beauty — is in the eye of the beholder. What one person calls a subsidy, another calls a tax exemption . . . or other expressions.

Virtually every segment of American life, directly or indirectly, receives some form of Federal subsidy. Yet, there's no uniform agreement on what constitutes a subsidy. As a matter of fact, most private enterprises and Federal agencies resist the use of the word.

We hear expressions like: depletion allowance . . . land grants . . . grazing rights . . . tax credits . . . protective tariffs . . .

325 different Federal programs involve subsidies.

and many more. As a matter of fact, some 325 different Federal programs involve subsidies in one form or another.

It is, at times, quite difficult to recognize subsidies in various budgets. Other times, titles themselves tell the story: to cite a few examples of this confusion:

School Milk Program . . . Urban Renewal . . . Occupational Health . . . Sugar Act Program . . . Highway Safety . . . Old-Age and Survivors Health Insurance . . . the Export-Import Bank . . . and many more such programs which fill literally 9 to 10 pages of small print in various Federal publications.

There are four obvious conclusions about subsidies.

First: it's almost impossible to reach agreement on what constitutes such assistance. A subsidy for one individual is a human or other right or social responsibility for another.

Second: all areas of the economy — therefore, virtually all Americans — enjoy some form of subsidization, directly or indirectly.

Third: subsidies are as old as our government. They have long been acceptable — even if at times controversial — as adjuncts to our free enterprise system.

And finally, it's unrealistic either to support or oppose a subsidy without clearly knowing its public purpose and overall benefit to the country.

Subsidies seek to achieve a more equitable society. And that poses a major question: what is equitable? We also must ask: apart from equity, what are our national priorities? What is best for the country now and how can we best accomplish those priorities?

Subsidies seek to achieve a more equitable society.

18

Let's concentrate on the issue directly affecting us — subsidization of western water projects.

Last year a congressionally-mandated task force made a review of one of our projects — the San Luis Unit of the Central Valley Project, Calif. Their report estimated the subsidy to irrigation on that project at \$1,540 per acre. You should understand that the subsidy is made up of two components: 1) interest on funds "borrowed" from the Federal Treasury to construct the irrigation facilities over the repayment period of 40 or 50 years at 6½ percent, and 2) that part of the cost of facilities which is beyond the water users ability to repay. The total present value of the subsidy for the unit was estimated at \$770 million compared to the actual construction cost of \$595 million.

By comparison, on this same basis, the Washington D.C., Metro system with its total estimated cost of \$6.7 billion with no repayment will receive a subsidy of \$117.2 billion over

the same 50-year period. That is a subsidy of \$23,400 for each of the 5 million people residing in the metropolitan area.

Since the start of Reclamation at the beginning of this century the Federal Government and the American people have established the policy that most Reclamation project costs should be repaid in full.

Originally all Reclamation construction costs were to be paid from the Reclamation Fund, the receipts of which came primarily from activities in the Western States. Today the Reclamation Fund finances as much as 40 percent of our annual construction costs — western monetary support for western development.

Most Americans are, however, still not aware that repayment of all reimbursable project costs, including operation and maintenance and replacement costs, are the responsibility of the project beneficiaries. Power investments are repaid *with* interest in a fixed period of time — usually about 50 years. Municipal and industrial water supply costs are repaid by water users over 50 years — *with* interest in virtually all cases. Irrigation costs are repaid by the users up to their ability to pay — without interest. As you know, irrigation construction costs in excess of the farmer's ability to pay are repaid by the other project beneficiaries — primarily, from power sales. The payment period normally is not to exceed 50 years after the facilities begin to produce revenues.

As Westerners know, the Federal policy of no interest charges on irrigated water goes back to the 1902 Reclamation Act. The interest-free program allowed families with a love for

land to establish homesteads and open the West to generations of unborn Americans.

Times have changed since we launched those much-needed economic and social programs more than 75 years ago. Economic and social conditions have obviously changed. Some reform is obviously needed.

Yet today, some of the Nation's leading publications and important interest groups describe western water projects in such terms as . . . boon-doggie . . . pork-barrel . . . and a financial burden to the Nation that is "wasteful."

One leading publication described Denver's Foothills water supply project as a federally-funded western boon-doggie. The fact is that the project is not federally financed at all, but we are in the habit of using broad generalizations when we don't understand something.

Fiction is getting in the way of important facts about water in America today. And this seems as good a time as any to present — in the interest of fairness — some of the facts.

We've been in the Reclamation business for 76 years here in the United States. During that time, the Congress has appropriated approximately \$8.7 billion for construction of Reclamation projects across the 17 Western States. Of that total, about \$7 billion will be repaid to the Federal Treasury — about half of that with interest.

About \$1.6 billion has actually been repaid — between 20 and 25 percent — of the \$7 billion thus far. Some \$3.9 billion, or a little over one-half, of the \$7 billion has been used for construction of irrigation facilities. These funds are reimbursable without interest. Nearly all of the remainder of the construction funds were for power and

municipal and industrial water facilities, and they're reimbursable with interest.

Costs for purposes such as flood control, fish and wildlife, and outdoor recreation, as well as historical and archeological work, are partially or wholly nonreimbursable. This is because the benefits are widely dispersed among our population. And it's difficult to assign or exact repayment from the general populace for them.

To complete Reclamation's financial picture, these overall totals are important. As of June 30, 1976, Reclamation projects with estimated costs of nearly \$17.3 billion have been authorized since the original Act was written. Nearly \$14.6 billion of this will be reimbursed. Not all of these projects — as we know — have had funds appropriated to start their construction. The crucial consideration is that nearly 85 percent of these funds are to be returned to the Federal Government by the beneficiaries, about half with interest.

Nearly \$17.3 billion have been authorized . . . nearly \$14.6 billion will be reimbursed.

There are innumerable examples of our contributions to American Society, but let me offer just a few significant statistics. Reclamation's water deliveries are now producing well over \$4 billion in gross crop value annually. Our involvement in food, fiber, and forage production amounts to about 60 million tons annually. We have more than 60 million recreation visitor-days at our

projects each year. Flood control benefits total more than \$50 million annually.

It's estimated that \$12.1 billion in net economic or national business activity during 1976 was attributable to Reclamation. Personal income and corporate profits from this totaled \$7.4 billion and \$1.6 billion, respectively.

This same economic activity generated \$1.9 billion in Federal taxes and nearly \$1 billion in state and local taxes.

As all of you know, Reclamation serves a population of more than 18 million — over 30 percent of the 17 Western States' population. Our work is critical to many rural areas throughout the West.

More than 5 million people left the Nation's farms in the 1960-70 decade, according to the 1970 decennial census. Many are still migrating from farms and rural areas to big cities. The increase in farm production, as well as related jobs, helps mitigate this trend in some of our declining rural areas in the West.

Federal Government policy today calls for population dispersion. As a Nation, we're striving to curtail the Nation's growing urbanization — with the pollution, housing, general quality-of-life, and other major problems associated with it. These problems, we may add, call for multi-billion-dollar Federal subsidies in housing, health, welfare, education, and other areas of public concern.

Let's consider at random some of the subsidization costs of other programs to the Nation.

The American taxpayer will pay more than \$500 million in subsidies for Amtrak this year. It's estimated that Amtrak will need about \$1 billion a year in subsidies starting in 1984.

Under various foreign aid programs — strictly foreign aid, not other foreign activities — the United States will spend approximately \$10.7 billion for the 1978 and 1979 Fiscal Years. That's almost as much as we have spent in our entire 76 years of Reclamation activities. Obviously, our figures are not in constant dollars. But the entire budget for the same two years may be noteworthy. It comes to somewhat over \$1.4 billion.

Federal outlays for farm income stabilization — for fiscal years 1978 and 1979 — will amount to more than \$12 billion.

The Federal Government currently provides substantial assistance to urban areas through a wide array of programs. Estimated outlays for these major direct urban programs in Fiscal Year 1979 totals more than \$16 billion.

The Federal educational budget for 1979 is approximately \$12 billion.

U.S. foreign aid expenditures are coming under increasing public scrutiny — particularly American subsidization of foreign water projects. One of the leading critics of these water expenditures is Senator Ernest Hollings of South Carolina. Beginning with a written report in 1977 and in subsequent speeches, the Senator has pointed out that the United States is contributing about \$1 billion annually to foreign water projects through the World Bank. Specifically, we're contributing about 31 percent each year to the Bank's International Development Association budget, and 22 percent of the budget of its International Bank for Reconstruction and Development.

Our \$1 billion contribution to the World Bank is an annual grant while the two bank subsidiaries offer one-to-two per-

cent low interest loans to various nations for their water projects. No repayment of any kind is made to the U.S. by the Bank or the nations receiving the loans.

The World Bank itself explains that virtually all its water projects concern basic irrigation meaning, and I quote, "the alleviation of hunger — not over-production as in the United States."

The Bank's position is that the United States does receive a form of repayment by creating markets that eventually will purchase some of our exports.

20 I'm not arguing against this or any other expenditure of the Federal budget. I happen to believe many subsidies make sense. However, I am saying that the American people should clearly understand that nearly 85 percent of whatever funds it lays out in behalf of virtually all Reclamation programs is repaid — half of it with interest, directly in dollars-and-cents, to say nothing of various indirect benefits which I outlined earlier.

Nearly 85 percent of all Reclamation programs is repaid — half of it with interest, directly in dollars-and-cents.

The office of Senator Hollings advised that he had not updated his figures since 1977, but from the Senate Hearings of the Committee on Appropriations it was learned that since 1948 the World Bank and other foreign assistance agencies have made \$10.75 billion available to finance or help finance water and water-related projects in other nations, for which this

country receives no repayment in money for its share of the costs.

That total since 1948 exceeds our own investment in construction in Reclamation since 1902, and our investment is partially reimbursable.

Health care . . . income security . . . veterans' benefits — the innumerable subsidies paid out each year across the spectrum of the American populace began because of need and equity. But a real case also can be made in behalf of Reclamation and its return to the American people. This involves not only the integration of the United States, as a single nation, but the integration of its markets, people, and natural resources. And much of these resources, particularly energy, are found in the 17 Western States.

From the standpoint of the National Water Resources Association and its member water user organizations, I would like to emphasize a very important concern, the resolution of which could go a long way toward stilling the voices criticizing our program for its subsidy. I am referring to greater recovery of project costs through repayment and water service contracts. In his June 5, 1978, water policy message the President directed the Secretary of the Interior to:

"1. require that new and renegotiated contracts include provisions for *recalculation and renegotiation of water rates every five years*. This will replace the previous practice of 40-year contracts which often do not reflect inflation and thus do not meet the beneficiaries' repayment obligations;

2. under existing authority add provisions to *recover operation and maintenance*


costs when existing contracts are renegotiated, or earlier where existing contracts have adjustment clauses;

3. *more precisely calculate and implement the 'ability to pay' provision in existing law which governs recovery of a portion of project capital costs.*"

The adoption of new policies along these lines has already assured greater present and future repayment of construction costs. We will continue to insist on recovery of a greater share of project costs from project direct beneficiaries. It contributes little toward the public acceptance of the Reclamation program for present or potential water users to attempt to obtain special consideration or exemption from repayment provisions through the political process.

As I said earlier, beauty is in the eye of the beholder. So is any subsidy. It's doubtful that even the most learned studies on this subject, complex as it is, will ever clearly determine the fairness or validity of the Nation's many Federal subsidies.

Even more important, we Americans will probably never truly reach the goals we most value: liberty . . . equality . . . individual stability . . . and individual well-being. Perhaps, as some believe, the greatness of this country is in the honesty of its striving, not in any definitive achievement or final accolade.

It is our job — yours and mine — to strive knowing that we'll never reach any absolute goals. 

Yesterday and Today in the ERA

Hohokam Canals and the Salt River Project

by Larry Doerschlag



Yesterday

The Salt River Valley began its agricultural tradition about 300 B.C. with the Hohokam Indians. During their 1,700-year occupation, they created a system of putting water over the dry desert landscape that many today feel was the best in the world. Why they abandoned the Valley and where they went is still a mystery puzzling many archeologists.

The fact that they did occupy the Valley and that they did construct about 250 miles of canals during their stay is the significant aspect of what was to come.

Approximately 400 years after the Hohokam vanished, settlers once more took advantage of the Salt River Valley's farming potential.

In the late 1800's the pioneers recognized that some sort of ancient civilization had utilized the land by irrigation methods. They saw long parallel ridges fanning out from the river which convinced them that a canal system was possible.

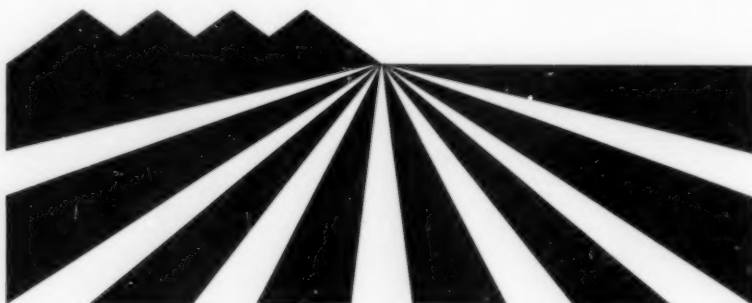
The farmers and settlers formed canal companies. They were able to redig and make additions to many of these ancient canals.



Diorama of Hohokam Indians digging an irrigation canal. Digging sticks and flat stones were used to remove dirt.



These pioneers followed the prehistoric ditch pattern for many canals.



22 Today

Today, farming is once more the dominant industry in the Salt River Valley. The Salt River Valley Water Users' Association was organized in 1903 to insure an adequate supply of water for the area. This Association's efforts together with the passage of the Reclamation Act of 1902 enabled the Reclamation Service (now the Bureau of Reclamation) to build a series of storage dams and new canals, some of which closely parallel the ancient canals dug by the Hohokam. The assured supply of water has made the Salt River Valley one of the most desirable and fastest-growing areas in the Nation today.

Larry Doerschlag is the Salt River Project Historian and is located in Tempe, Ariz.

Photography by: Gene Hertzog, Regional Photographer, Lower Colorado Region, Boulder City, Nev.

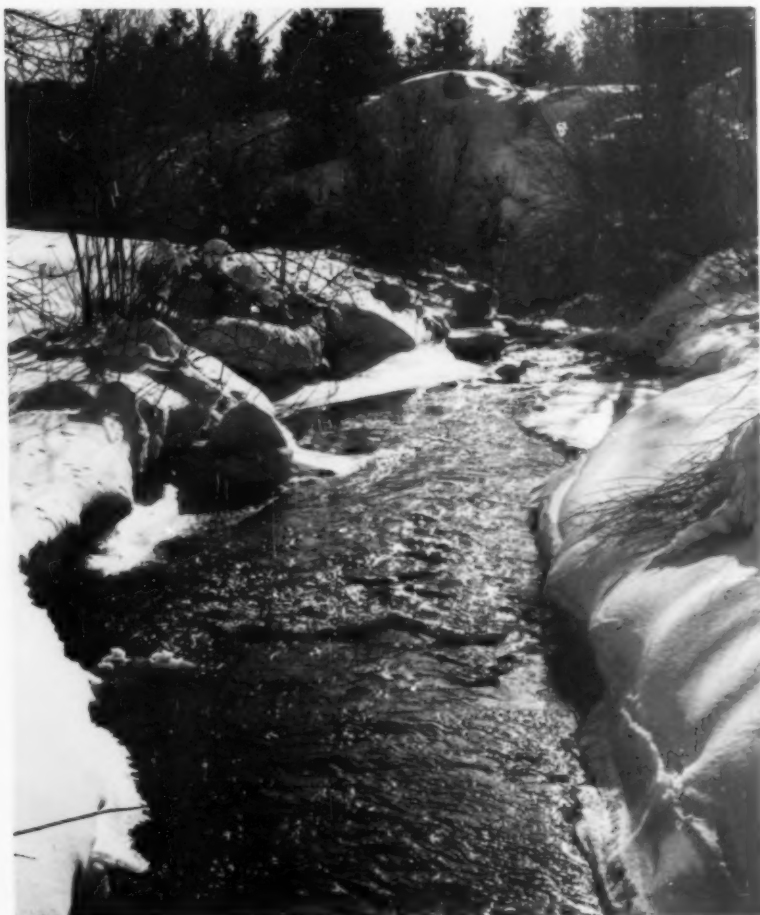


Today the Salt River Project consists of about 1,300 miles of canals and laterals.



Highline Canal south of Phoenix

Water Quiz



23

1. Pure water in the liquid form is:
 - a. never found in nature
 - b. sometimes found in nature
 - c. abundant in nature
2. At what point is water the most dense?
 - a. 32 degrees F
 - b. 35 degrees F
 - c. 39 degrees F
3. What percentage of all plants and animals live in water?
 - a. 50%
 - b. 75%
 - c. 90%
4. The temperature at which water changes to ice depends on the pressure and how much dissolved salts the water contains. The effect of these two things is to (raise - lower) the freezing point.



24

Andrus Accelerates Water Policy Coordination and Planning

Secretary of the Interior Cecil D. Andrus has stepped up efforts to carry out President Carter's new national water policy.

Nineteen task forces are working to implement directives that deal with four principal areas:

- planning efficiency and planning process reform;
- environmental quality and water resources management;
- Federal-State cooperation in water management;
- national emphasis on water conservation.

The Secretary assigned lead responsibility for government-wide implementation to Guy Martin, Assistant Secretary for Land and Water Resources.

A focal point was established early in October in Martin's office through the creation of a small staff that will oversee administration and Departmental efforts.

The group is led by John Cunningham, from Martin's immediate office; Bruce Glenn, Reclamation; William Spaulding, Fish and Wildlife; and Don Peterson, a participant in Interior's Management Development Program.

Residency Requirements Don't Apply Under Small Projects Act

Interior Solicitor Leo M. Krulitz has determined that the residency requirement of Reclamation law, and the requirement that excess landowners divest themselves of excess lands in order to receive Reclamation benefits, do not apply to lands using facilities built under the Small Reclamation Projects Act (SRPA).

The ruling relates to owners of 1.2 million acres receiving benefits from the 46 projects completed and 19 now being built under the 1956 Act. Exemption from the excess land divestiture provision is likely to have more impact than the residency ruling, Krulitz said. Of the 1.2 million acres in the small projects, over 200,000 are considered excess. The number of non-resident owners is not known but is thought to be small.

The SRPA requires project beneficiaries to repay with interest the share of the Federal loan which is attributable to furnishing irrigation benefits to land held by any one owner in excess of 160 acres. Krulitz said hearings, floor debates and comments of the Act's sponsors show Congress' intent to substitute the interest provision for the excess lands divestiture requirement of Reclamation law.

Noting that some SRPA loans are being used to build facilities to receive benefits from other, ordinary Reclamation projects, Krulitz emphasized that his ruling does not waive the residency or divestiture requirements for those lands also receiving water from projects built under regular Reclamation law.

The SRPA was intended to encourage state and local participation in the development of projects with Federal help in the form of grants and loans. It was also designed to speed congressional approval of projects so small they might otherwise be pushed aside.

Final Rules Published For Reclamation's Cultural Resources Responsibilities

Final rules establishing the policies and procedures for the Bureau of Reclamation's identification and administration of cultural resources have been published in the October 10, 1978, *Federal Register*.

Secretary of the Interior Cecil D. Andrus said that these comprehensive guidelines are the first to be completed by an Interior agency and may be used as a model by other agencies.

These rules, explained Commissioner of Reclamation R. Keith Higginson, address the responsibilities of Reclamation for the identification and protection of historical, archeological, architectural, scientific, and paleontological resources affected by Bureau actions or on Bureau lands. If a cultural resource is discovered during construction of a project, provisions are made to delay or change the work schedule, Higginson said.

The Bureau of Reclamation's responsibilities also include notification of the Secretary of the Interior when it is deter-

mined that a proposed Reclamation project would cause irreparable loss or destruction of cultural resources listed or eligible for listing in the National Register of Historic Places. The Bureau is also required to prepare an annual report of activities regarding cultural resources.

The Bureau may delegate curatorial responsibilities to museums, universities, or other institutions, or provide storage for materials or objects recovered or to use them in interpretative displays.

Final Plans For Public Involvement In Contracting Process Announced.

Procedures permitting public participation in the formulation of all new, amendatory, or supplemental water service and repayment contracts where the United States is a party or subcontracts which require Federal approval have been announced by the Department of the Interior.

These new procedures are effective immediately and are applicable to ongoing contract negotiations to the greatest extent practicable.

Under the new procedures, all meetings scheduled by the Bureau of Reclamation for the purpose of discussing terms and conditions of contracts would be open to the public as observers. In addition, pertinent written correspondence on the proposed contract would also be available.

The Commissioner of Reclamation would determine if, when, and where public hearings would be held to receive comments on any proposed contract. A summary of all written comments received and testimony presented at any public hearing would be considered by the local Regional Director, Commissioner of Reclamation, and the Secretary of the Interior prior to approval or disapproval of a given contract. The Commissioner of Reclamation would establish points of public access to each proposed contract under consideration and make copies available to interested parties pursuant to procedures under the Freedom of Information Act, as amended (80 Stat. 383, 5 U.S.C. 552).

The procedures were published in the January 2, 1979 *Federal Register*.

dust to ducks

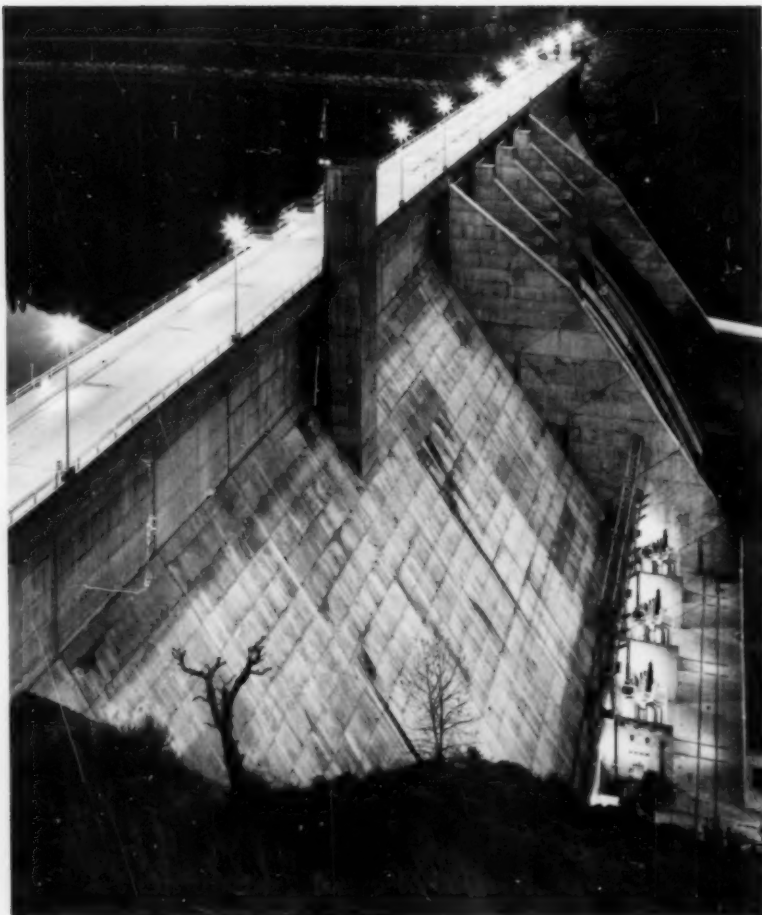
26

In March 1972 a milestone in the history of Reclamation's program for a livable environment was begun — the Canyon Ferry Dust Abatement Program in Montana.

Unlike most tides which are daily, the "tide" (fluctuation) of Canyon Ferry Reservoir is annual. The exposed lakebed dried and the fine sand was blown about by gusts of wind, creating a nuisance in nearby towns and a serious problem for crops.

Reclamation has transformed those "mud flats" into permanent pools of shallow water, creating a nesting area for waterfowl and a wildlife habitat.

Lyle Axthelm, regional photographer in the Upper Missouri Region, took these before-and-after shots of Canyon Ferry Dam and Reservoir.





27



Water

Quiz



28 ANSWERS

1. a. Pure water in the liquid form is never found in nature, and is extremely hard to produce in the laboratory.
2. c. 39° , below and above this mark water begins to expand, toward the formation of ice or creation of steam.
3. c. 90%
4. lower, the effect of salts in water is to lower the freezing point and as pressure increases, the freezing point is lowered again.



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